

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
26 May 2005 (26.05.2005)

PCT

(10) International Publication Number
WO 2005/047350 A2

(51) International Patent Classification⁷: **C08F 110/02,**
4/70

F-79170 Bressuire (FR). RAZAVI, Abbas [IR/BE]; 35,
Domaine de la Brisée, B-7000 Mons (BE).

(21) International Application Number:
PCT/EP2004/052820

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date:
5 November 2004 (05.11.2004)

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(25) Filing Language: English
(26) Publication Language: English

Published:

— without international search report and to be republished upon receipt of that report

(30) Priority Data:
03/13352 14 November 2003 (14.11.2003) FR

(71) Applicants (*for all designated States except US*): TOTAL PETROCHEMICALS RESEARCH FELUY [BE/BE]; Zone Industrielle C, B-7181 Seneffe (Feluy) (BE). CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE [FR/FR]; 3, Rue Michel Ange, F-75016 Paris (FR).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): LAVASTRE, Olivier [FR/FR]; La Mazure, F-35490 Gahard (FR). BONNETTE, Fabien [FR/FR]; 26, Rue de Bel'Air,



WO 2005/047350 A2

(54) Title: HETEROGENISATION OF POLYMERISATION CATALYSTS BY IONIC LIQUIDS

(57) Abstract: The present invention discloses a method for preparing a dissolved catalyst component comprising the steps of: a) providing a halogenated precursor component of formula (I) X-[CH₂-]_n b) reacting the halogenated bisimine precursor with an ionic liquid precursor in a solvent to prepare an ionic liquid; c) mixing in a solvent one equivalent of the ionic liquid prepared in step b) with a metallic complex of formula (II) L₂MY₂ wherein L is a coordinating ligand for the metallic site, said coordination being achieved by phosphorus, nitrogen or oxygen; d) evaporating the solvent; and e) retrieving a hybrid single site catalyst component/ionic liquid system. It also discloses an active catalyst system heterogenised by an ionic liquid and its use in the polymerisation of olefins.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
26 May 2005 (26.05.2005)

PCT

(10) International Publication Number
WO 2005/047350 A3

(51) International Patent Classification⁷: C08F 4/70,
110/02

(21) International Application Number:
PCT/EP2004/052820

(22) International Filing Date:
5 November 2004 (05.11.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03/13352 14 November 2003 (14.11.2003) FR

(71) Applicants (for all designated States except US): TOTAL PETROCHEMICALS RESEARCH FELUY [BE/BE]; Zone Industrielle C, B-7181 Seneffe (Feluy) (BE). CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE [FR/FR]; 3, Rue Michel Ange, F-75016 Paris (FR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): LAVASTRE, Olivier [FR/FR]; La Mazure, F-35490 Gahard (FR). BONNETTE, Fabien [FR/FR]; 26, Rue de Bel'Air, F-79170 Bressuire (FR). RAZAVI, Abbas [IR/BE]; 35, Domaine de la Brisée, B-7000 Mons (BE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
25 August 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2005/047350 A3

(54) Title: HETEROGENISATION OF POLYMERISATION CATALYSTS BY IONIC LIQUIDS

(57) Abstract: The present invention discloses a method for preparing a dissolved catalyst component comprising the steps of: a) providing a halogenated precursor component of formula (I) X-[CH₂-] - b) reacting the halogenated bisimine precursor with an ionic liquid precursor in a solvent to prepare an ionic liquid; c) mixing in a solvent one equivalent of the ionic liquid prepared in step b) with a metallic complex of formula (II) L₂MY₂ wherein L is a coordinating ligand for the metallic site, said coordination being achieved by phosphorus, nitrogen or oxygen; d) evaporating the solvent; and e) retrieving a hybrid single site catalyst component/ionic liquid system. It also discloses an active catalyst system heterogenised by an ionic liquid and its use in the polymerisation of olefins.